FLORIDA POLYTECHNIC UNIVERSITY

Concept Selection & Evaluation

Lecture 7 – Capstone

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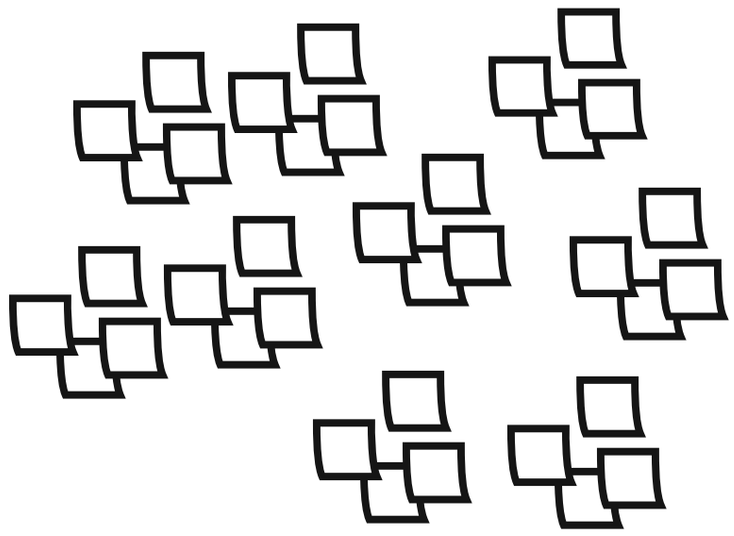
We Have Ideas

Now What?

- You should now have many ideas to try and solve your design problem.

- Now, its time to decide which ideas are “best”.

1. What concepts should be explored?
2. How do we choose which ones?
3. What criteria should we use?
4. Should we involve stakeholders?
5. What tools and methods exist?



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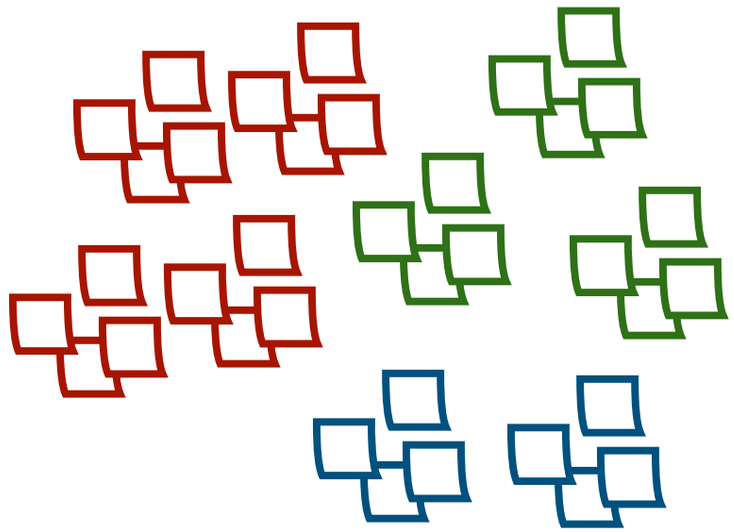
Group the Ideas

Identifying Similarities

- It is a good idea to group your ideas into categories.
  - Some ideas might be similar to each other.
  - Some may overlap between multiple categories.
  - Some might solve a different problem entirely, which is okay!.
- Grouping ideas can…
  - **Help Find Patterns:** you can see common trends and identify key themes that emerge.
  - **Simplify Decision-Making:** Grouping can make it easier to compare and evaluate them against each other.
  - **Ensure Coverage:** Grouping helps ensure that all solutions are considered. Maybe one group has far fewer ideas.
  - **Facilitate collaboration and discussion:** Grouping ideas can make it easier for teams to discuss them collectively.



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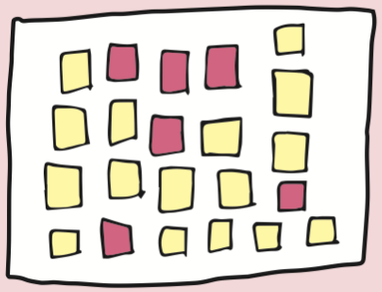
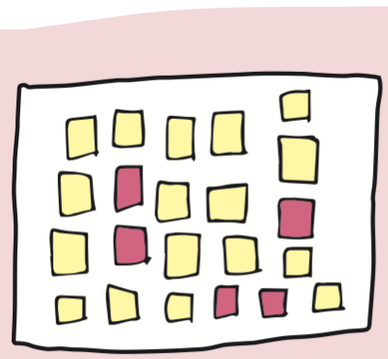
Types of Grouping

Different Slices

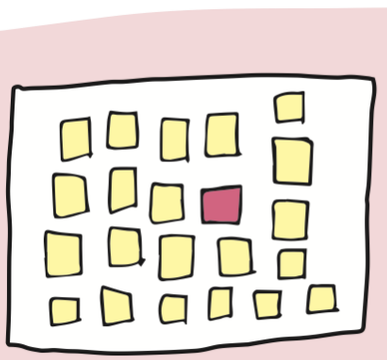
A) Matches the question

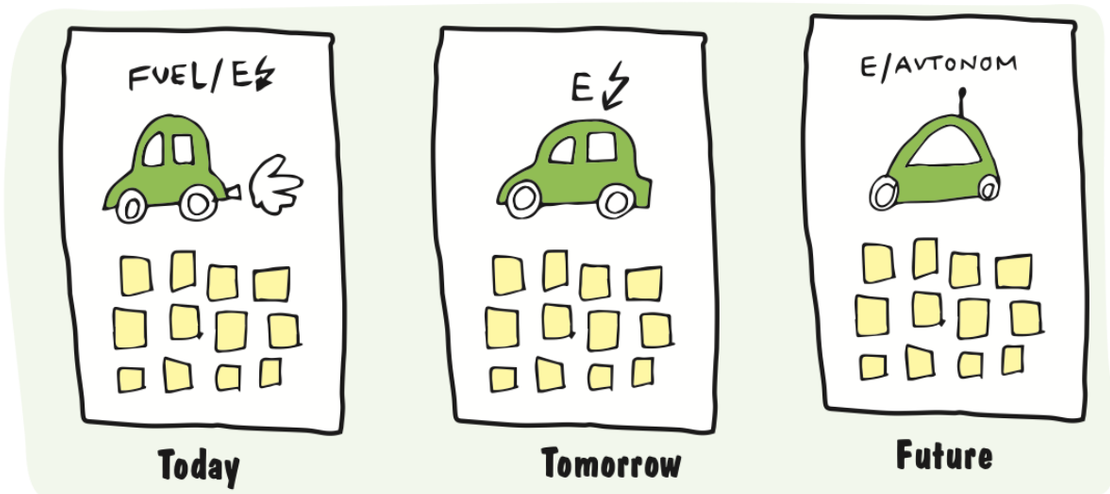


B) Exciting



C) Out of scope





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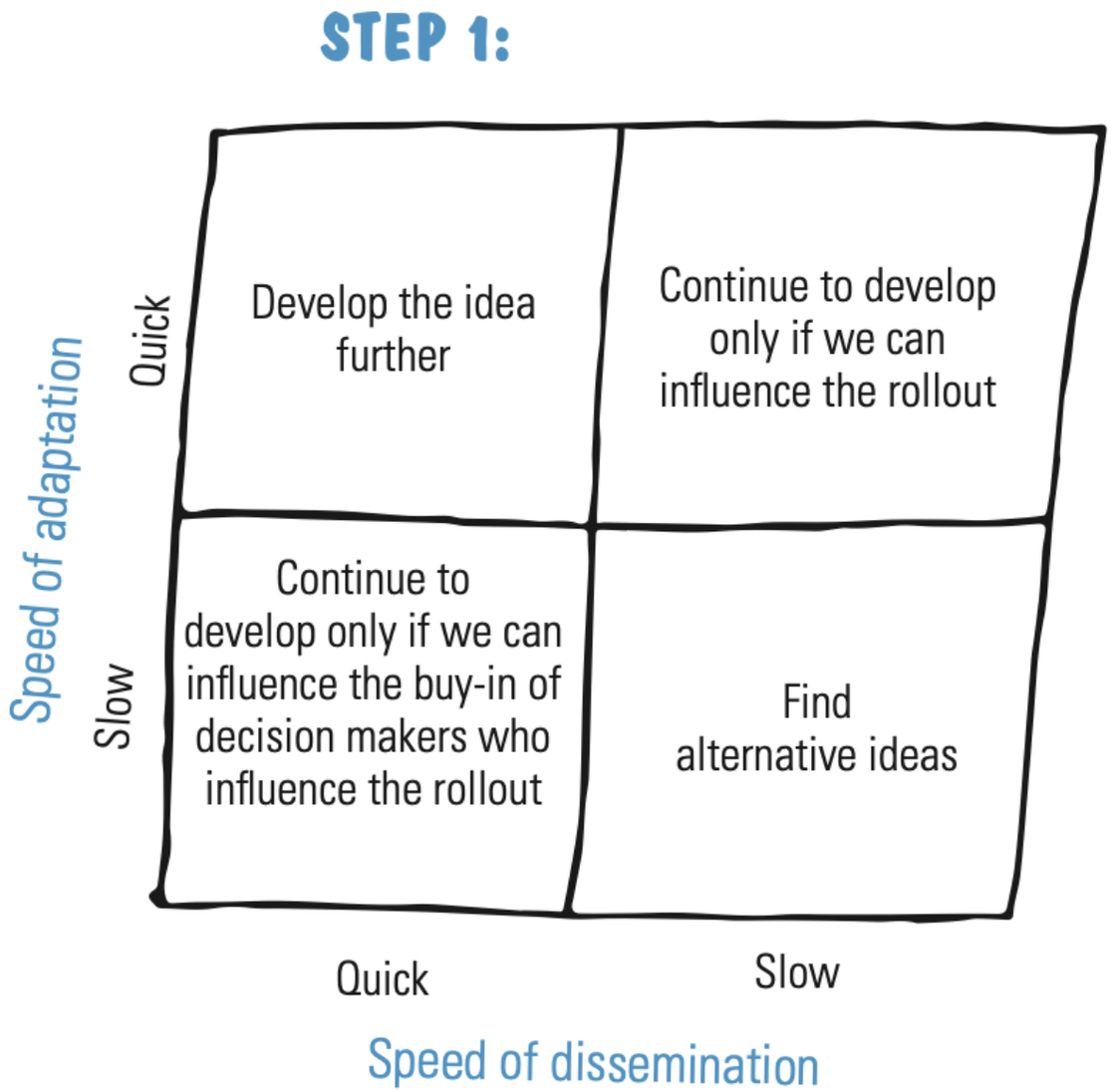
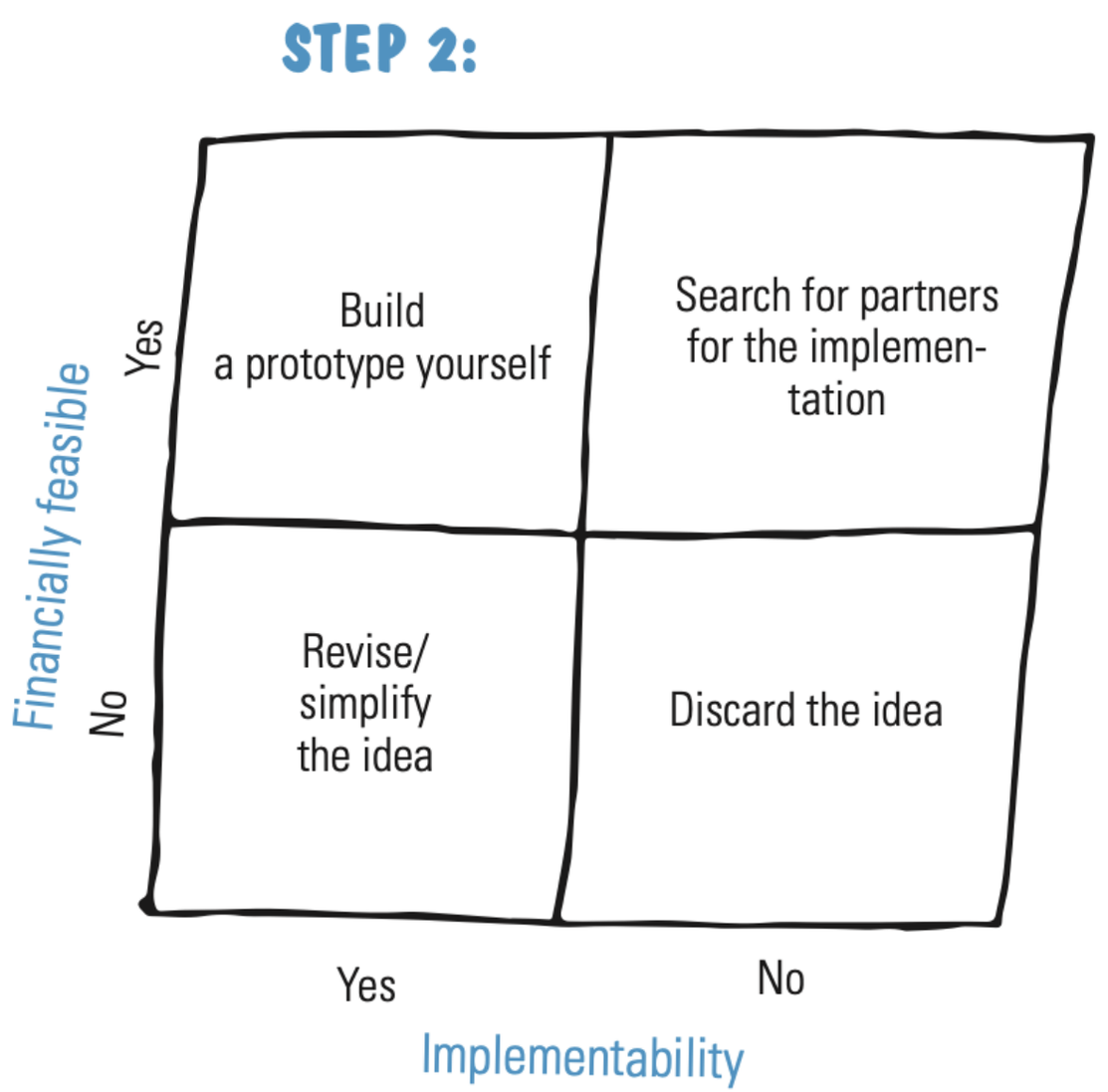
Stepwise Selection

Dissemination & Implamentability


STEP 1:
Develop the idea further
Continue to develop only if we can influence the rollout
Continue to develop only if we can influence the buy-in of decision makers who influence the rollout
Find alternative ideas
Quick
Slow
Speed of adaptation
Quick
Slow
Speed of dissemination



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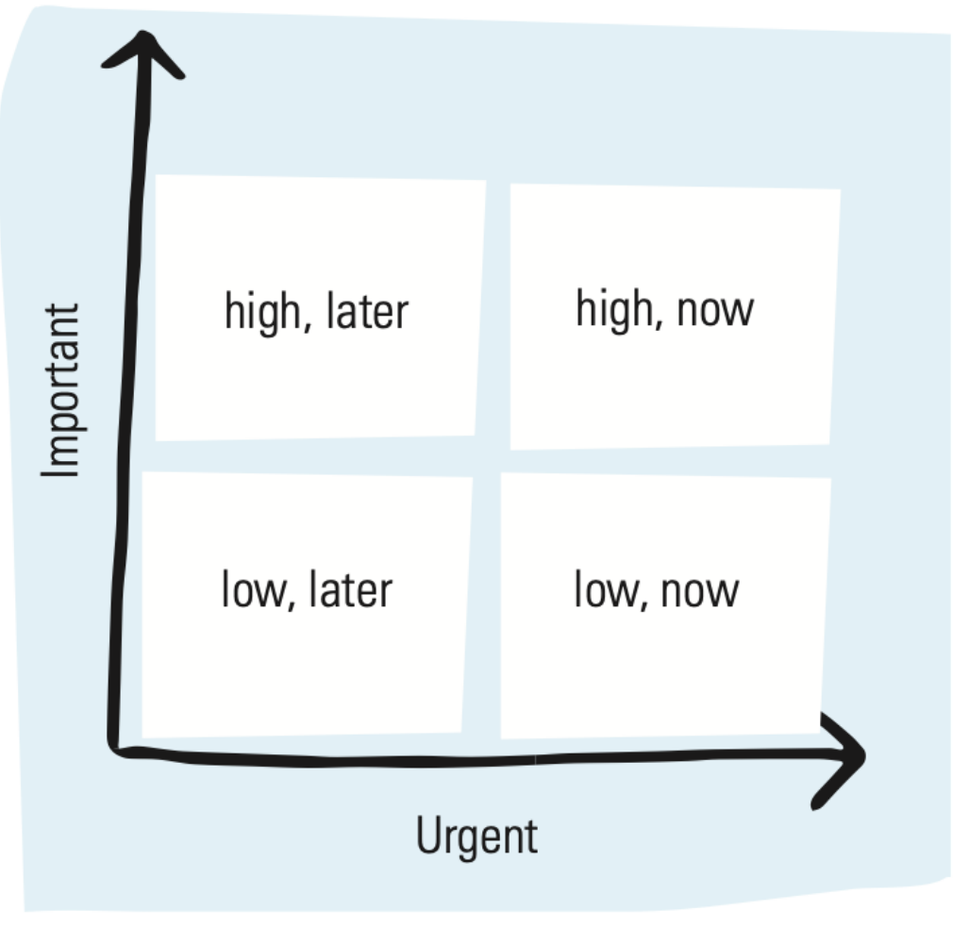
Eisenhower Matrix (Time Management)

Important vs. Urgent

- **Urgent and Important**: Tasks that require immediate attention and have a significant impact.
- **Important, Not Urgent**: Tasks that are crucial but do not require immediate action. Planning and strategizing for these are important.
- **Urgent, Not Important**: Tasks that need to be done soon but are of lower importance. These might be distractions or less critical tasks.
- **Not Urgent, Not Important**: Tasks that are neither time-sensitive nor impactful. These are often considered low priority or even unnecessary.



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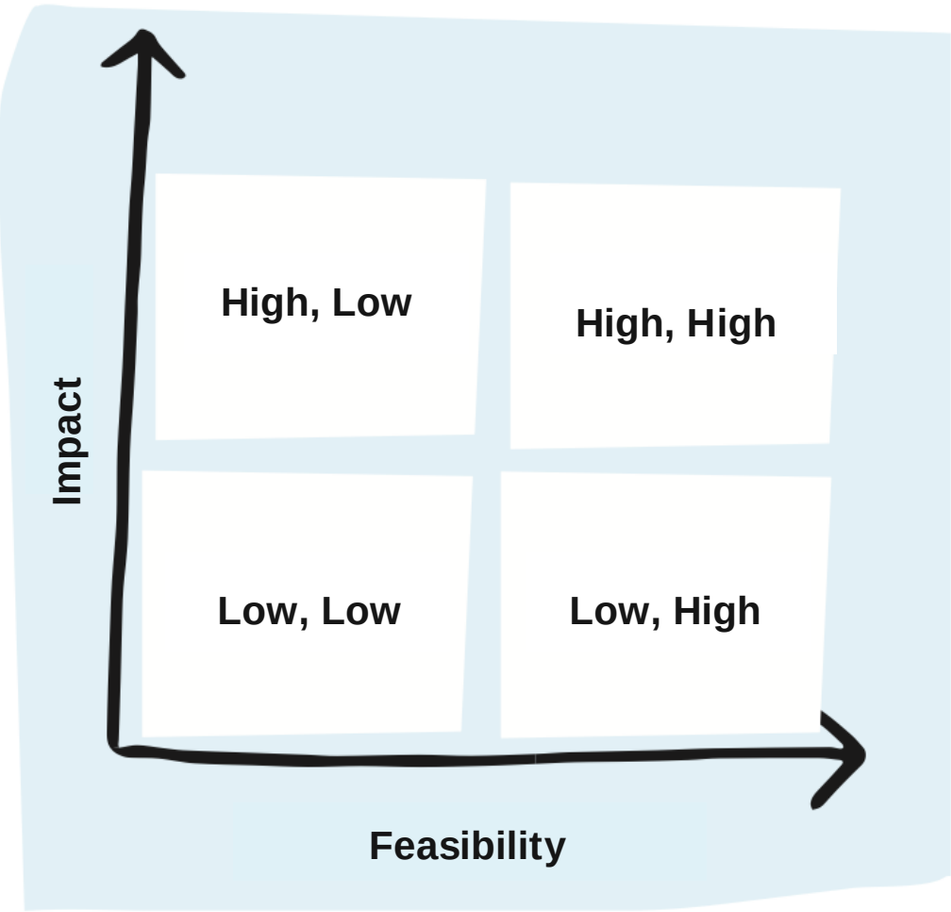
Eisenhower Matrix (Concept Selection)

Impact vs. Feasibility

- **High Impact, High Feasibility:** Prioritize these ideas as they are both beneficial and achievable.
- **High Impact, Low Feasibility:** Explore these ideas further. They have great potential but require significant effort or innovation to realize.
- **Low Impact, High Feasibility:** Consider implementing these if resources permit, as they are easy wins even if they don’t drastically change outcomes.
- **Low Impact, Low Feasibility:** Avoid these ideas. They offer little benefit and are hard to implement.



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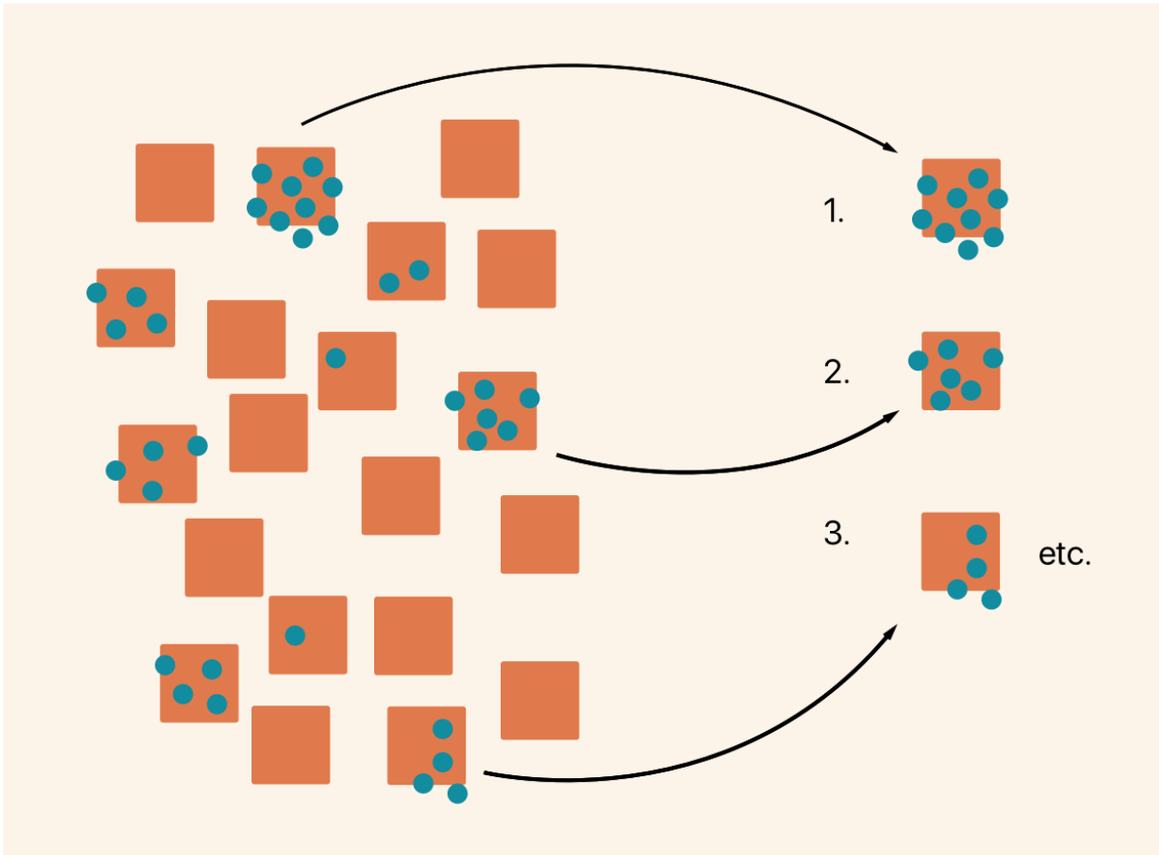
Dot Voting

Quick & Democratic

- **Step 1:** Define your criteria.
- **Step 2:** Hang your ideas on a wall (like the gallery method).
- **Step 3:** Give team members a set number of “dots” (3-5).
- **Step 4:** All team members place their dots on their favorite ideas within the context of the selected criteria.
- **Step 5:** Relocate ideas with the most votes for discussion.



NASA’s A-Team at JPL
Uses Dot Voting!

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Pugh Matrix

AKA a Decision Matrix

- **Define a Baseline Concept**: Choose one existing concept as the baseline for comparison.
- **List Evaluation Criteria**: Identify key criteria that are important for the decision (e.g., cost, performance, feasibility).
- **Score Each Concept**: Compare each concept against the baseline using scores:
  - **“+”**: Better than the baseline
  - **“0”**: Same as the baseline
  - **“-”**: Worse than the baseline
- **Analyze Results**: Sum the scores to identify which concept performs best overall.

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Pugh Matrix Examples

Generic & Example

Criteria	Baseline Concept	Concept A	Concept B	Concept C
Cost	-	0	+	-
Performance	0	+	0	+
Feasibility	0	-	+	+
Total Score		0	2	1

Criteria	Baseline Concept	Concept A	Concept B	Concept C
Requirement 1	0	+	+	-
Requirement 2	0	+	+	-
Requirement 3	0	0	+	+
…	…	…	…	…
Total Score	0	2	3	-1

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Pugh Matrix Activity

You Try It

- Design a portable water filtration system for use in outdoor activities. The system should be efficient, cost-effective, easy to use, durable, and require minimal maintenance.

Criteria/Ideas	Gravity Filter	Pump Filter	UV Purifier	Bottle Filter	Straw Filter
Performance					
Cost					
Ease of Use					
Durability					
Maintenance					
Total Score					

- You can use ”- -”, “-”, “0”, “+”, and “++” for rating.

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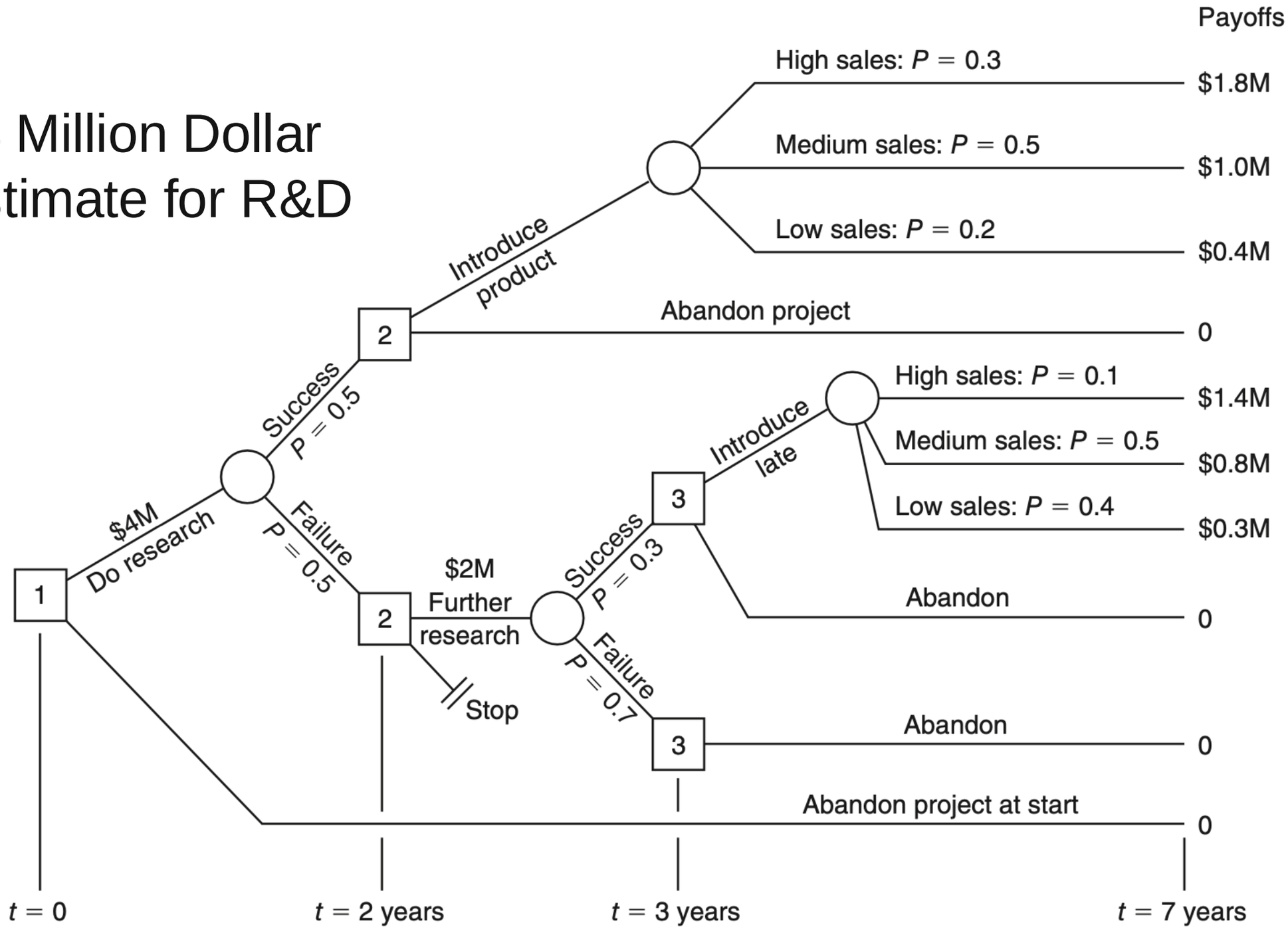
Decision Trees

Making Decisions Under Uncertainty

4 Million Dollar Estimate for R&D



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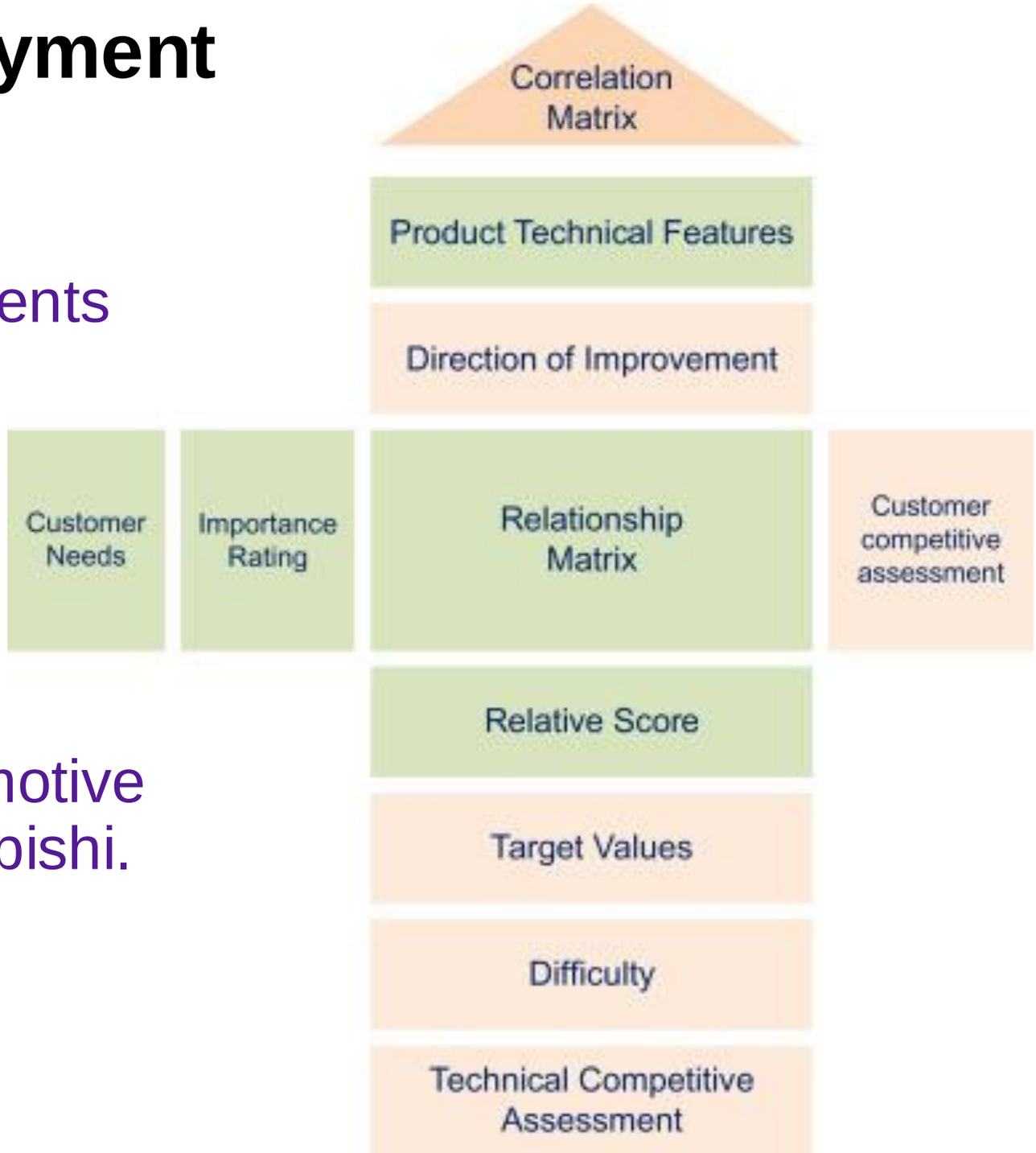
QFD

Quality Function Deployment

- **AKA:** House of Quality
- Customer Needs + Requirements
- “What” to “How”
- Customer Driven
- Originated in Japan

- Used extensively in the automotive industry from Toyota to Mitsubishi.



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QFD Template

In its Modern Form

Quality Function Deployment

Project Title:
Project Leader:
Date:

Correlation:	+	.	-
	Positive	No correlation	Negative

Relationships:	9	3	1	
	Strong	Moderate	Weak	None

		Desired direction of improvement (↑,0,↓)						Competitive evaluation (1: low, 5: high)				
	1: low, 5: high	**Functional Requirements (How)** →										
	Customer importance rating	**Customer Requirements - (What)** ↓						Weighted Score	Satisfaction rating	Competitor rating 1	Competitor rating 2	Competitor rating 3
1												
2												
3												
4												
5												
6												
7												
8												
9												
		Technical importance score										
		Importance %										
		Priorities rank										
		Current performance										
		Target										
		Benchmark										
		Difficulty						1: very easy, 5: very difficult				
		Cost and time						1: low, 5: high				
		Priority to improve										

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SWOT Analysis

For Each Concept

S	W	O	T
Strengths	Weaknesses	Opportunities	Threats
What is strong about the project? Do certain aspects perfectly align with your design requirements?	What isn't so great about the idea? In what ways does the idea not live up to identified customer needs?	How does the idea provide unique opportunities for the team or for the project's various stakeholders?	What exists that threatens an ideas success? Is the market saturated? Is the idea feasible?
Internal		External	

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References

Questions?

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- https://www.designheuristics.com
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- Lewrick, Michael, Patrick Link, and Larry Leifer. *The design thinking playbook: Mindful digital transformation of teams, products, services, businesses and ecosystems*. John Wiley & Sons, 2018.
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